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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/627,956	07/28/2000	Shawn W Smith	699-23-001	2385

7590 11/17/2003

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EXAMINER	
MEW, KEVIN D	

ART UNIT	PAPER NUMBER
2664	5

DATE MAILED: 11/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/627,956	SMITH ET AL.	
	Examiner	Art Unit	
	Kevin Mew	2664	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 July 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☒ Claim(s) *17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 July, 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: reference character "60" in line 21 of page 18 in the specification is not found in Fig. 7b. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: speed control/decoder in lines 30-31 of page 15, and line15 of page 16 should not just use one reference character "62" to specify both speed control and decoder. Separate reference characters such as "62" for speed control and "64" for decoder should be used in the specification.

Claim Objections

3. **Claim 6** is objected to because of the following informalities: the term "increasing" in the end of the phrase, "increasing the rate of data consumption when said jitter buffer size is increasing," should be stated as "decreasing" because the rate of data consumption is increasing under the condition when said jitter buffer size is decreasing. The reasoning behind this is based on the interpretation of Claim 4, which states that "reducing the rate of data consumption when said jitter buffer size is increasing." It is suggested that the

phrase "increasing the rate of data consumption when said jitter buffer size is increasing" be changed to "increasing the rate of data consumption when said jitter buffer size is decreasing."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1-8, 10-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohlsson et al. (US 6,452,950) in view of Cohen (US 6,389,032).

Regarding claims 1 & 10, Ohlsson discloses a receiving node and a method in a packet communication system that minimizes delays in packet delivery for digital voice communication by using Internet as the backbone for transmission of data (**a system for receiving digital voice signals transmitted over a data network**, see col. 2, lines 21-26 and element 1, Fig. 2A), comprising:

a jitter buffer that has a variable size, that stores packets arriving at the receiving node, that stores packets arriving at the receiving node, and that releases stored packets to an application executing in the receiving node (**a jitter buffer, having a variable storage size, arranged to receive packets and to**

store said packets and to serially output said packets, see col. 2, lines 28-32 and element 10, Fig. 2B).

a processor that monitors and varies the size of the said jitter buffer based on the estimated variation of packet transmission delay period derived from the times of arrival of stored packets (**a jitter buffer manager which monitors the arrival of said packets and determines at least one variation parameter which measures the variation in transit delay among arriving packets and controls jitter buffer size in response to the variation parameter**, see col. 2, lines 35-38 and element "Jitter Control", Fig, 2A).

Ohlsson does not explicitly show the use of a speed control module that adjusts the rate of voice data packets consumption in response to the variation in said jitter buffer size.

However, Cohen discloses a processor (a speed control module) at a receiving node for receiving and playing real-time audio signals over a multi-node communication network (see element 28, Fig. 1), which adjusts the size of a jitter buffer by changing the speed of playing the at least some of the audio data in the buffer (**modifying rate of consumption of packets from said jitter buffer to compensate for changes in said jitter buffer storage size**, see col. 3, lines 28-31 and lines 65-67).

Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system of Ohlsson with that of Cohen such that the rate of consumption of voice data packets is adjusted based on the variation in the jitter buffer storage size such as the processor taught by Cohen.

Having a control means coupled to both the "Jitter Control" and "Jitter Buffer" in the receiving node of Ohlsson, which receives a control signal from the jitter control and adjusts the rate of reading out voice data packets from the jitter buffer, such as the processor taught by Cohen would modify the receiving node of Ohlsson to arrive at the claimed invention. The motivation to do so is to maintain an optimal data packet delay without sacrificing a predefined acceptable level of audio speech signals because a long delay of voice signals due to the increase in the jitter buffer size can be minimized, and excessive discard of packets due to the decrease in the jitter buffer size can be avoided.

Regarding claim 2, Ohlsson discloses that the arrival time variance for packet is determined by the actual packet arrival time (**actual packet arrival time**, see col.8, lines 31-34) and the expected packet arrival time (**average packet arrival time**, see col. 8, lines 18-22). Ohlsson further discloses the processor in the "Jitter Control" (see Fig. 2A) would determine the size of the said jitter buffer by using the arrival time variance for packet (**jitter buffer manager controls said jitter buffer storage size in relation to variance**, see col. 2, lines 35-38, and col. 3, lines 44-45 and 47-48 and Fig. 2A).

Regarding claims 3 & 16, Ohlsson discloses a jitter buffer checks whether the buffer has received the number of packets (**buffer size to allow capture of a predetermined fraction of packets**, see col. 7, lines 13-16) specified by the "Sampling Interval" parameter (**within predetermined time window**, see col. 7, lines 13-16, and element 406, Fig. 4). Ohlsson further teaches that a desired packet delay can be achieved by maintaining a predetermined fraction of packets

received, depending on the "Lost Packets" count and "Accepted Loss" count (see col.7, lines 22-23 and lines 28-44). Therefore, it is inherent that a desirable ratio close to one is maintained between the "Lost Packets" count and the "Accepted Loss" count (**the predetermined fraction is less than or substantially equal to 1**) in order to achieve the predetermined acceptable delay.

Regarding claims 4 & 5, Ohlsson does not explicitly show the use of a speed control module to reduce the rate of data packet consumption when the jitter buffer size increases, while augmenting the data to maintain a predetermined audio output rate by selectively duplicating data corresponding to silent periods. However, Cohen discloses a processor that increases the size of the jitter buffer by evenly inserting silent packets between the words of the received audio data in the jitter buffer (see col. 2, lines 16-22), and by changing the speed of playing the data in the jitter buffer (see col. 3, lines 25-31, and lines 65-67). It is inherent that the speed of playing the data should be reduced when the size of the jitter buffer is increasing. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system of Ohlsson with that of Cohen such that the rate of consumption of voice data packets is reduced when the jitter buffer storage size is increasing such as the processor taught by Cohen. Having a control means coupled to the "Jitter Control" and "Jitter Buffer" in the receiving node of Ohlsson, which receives a control signal from the jitter control and adjusts the rate of reading out voice data packets from the jitter buffer, such as the processor taught by Cohen would modify the receiving node of Ohlsson. The motivation to do so is to maintain an

optimal data packet delay without sacrificing a predefined acceptable level of audio speech signals because a long delay of voice signals due to the increase in jitter buffer size can be minimized.

Regarding claims 6 & 7, Ohlsson does not explicitly show the use of a speed control module to increase the rate of data packet consumption when the jitter buffer size reduces, while selectively discarding the data corresponding to silent periods to maintain a predetermined audio output rate. However, Cohen discloses a processor that decreases the size of the jitter buffer by removing silent packets from the portion of the jitter buffer closest to being played (see col.2, lines 22-28), and by changing the speed of playing the data in the jitter buffer (see col. 3, lines 25-31, and lines 65-67). It is inherent that the speed of playing the data should be reduced when the size of the jitter buffer is decreasing. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system of Ohlsson with that of Cohen such that the rate of consumption of voice data packets is increased when the jitter buffer storage size is reducing such as the processor taught by Cohen. Having a control means coupled to the "Jitter Control" and "Jitter Buffer" in the receiving node of Ohlsson, which receives a control signal from the jitter control and adjusts the rate of reading out voice data packets from the jitter buffer, such as the processor taught by Cohen would modify the receiving node of Ohlsson. The motivation to do so is to maintain an optimal data packet delay without sacrificing a predefined acceptable level of audio speech signals because

excessive discard of packets due to the decrease in the jitter buffer storage size can be avoided.

Regarding claims 8 & 11, Ohlsson does not explicitly show a speed control module and a method, which adjust the rate of data consumption from said jitter buffer while maintaining audio output which substantially corresponds to natural human speech characteristics. However, Cohen discloses a processor that dynamically adjusts the size of the jitter buffer by changing the time used to play each received audio data packets without affecting the pitch of the audio data (**speed control module adjusts the rate of data consumption from said jitter buffer while maintaining audio output which substantially corresponds to natural human speech characteristics**, see col. 2, lines 34-39). Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system of Ohlsson with that of Cohen such that the rate of consumption of voice data packets is adjusted based on the variation in the jitter buffer storage size such as the processor taught by Cohen. Having a control means coupled to the "Jitter Control" and "Jitter Buffer" in the receiving node of Ohlsson, which receives a control signal from the jitter control and adjusts the rate of reading out voice data packets from the jitter buffer, such as the processor taught by Cohen would modify the receiving node of Ohlsson to meet the claimed invention. The motivation to do so is to maintain an optimal data packet delay without sacrificing a predefined acceptable level of audio speech signals because excessive discard of packets due to the decrease in the jitter buffer storage size can be avoided.

Regarding claim 12, Ohlsson does not explicitly show a method of selectively modifying a decoded speech signal with a speed control module, to mask changes in variable rate of transfer of packets. However, Cohen discloses a processor (speed control module) that increases the size of the jitter buffer by evenly inserting silent packets between the words of the received audio data in the jitter buffer (see col. 2, lines 16-22). Cohen further discloses the processor would decrease the size of the jitter buffer by removing silent packets from the portion of the jitter buffer closest to being played (see col.2, lines 22-28), and by changing the speed of playing the data in the jitter buffer (**selectively modifying a decoded speech signal with a speed control module, to mask changes in said variable rate of transfer of said packets**, see col. 3, lines 25-31, and lines 65-67). Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system of Ohlsson with that of Cohen such that the rate of consumption of voice data packets is adjusted based on the variation in the jitter buffer storage size such as the processor taught by Cohen. Having a control means coupled to the "Jitter Control" and "Jitter Buffer" in the receiving node of Ohlsson, which receives a control signal from the jitter control and adjusts the rate of reading out voice data packets from the jitter buffer, such as the processor taught by Cohen would modify the receiving node of Ohlsson. The motivation to do so is to maintain an optimal data packet delay without sacrificing a predefined acceptable level of audio speech signals because a long delay of voice signals due to the increase in the jitter buffer size can be

minimized, and excessive discard of packets due to the decrease in the jitter buffer size can be avoided.

Regarding claim 13, Ohlsson discloses a method in which an arrival time variance for each packet is calculated based on the difference between the actual arrival time for packet and expected arrival time for packet (**variance is calculated as a sum of deviations from a moving average of packet delay**, see col. 8, line 19, and lines 31-36).

Regarding claims 14 & 15, Ohlsson discloses a method in which packet arrival time variance is compared to a upper variance limit D_u and a lower variance limit D_l, respectively, and the size of jitter buffer should be increased or decreased according to the given variance limits (see col. 9, lines 14-45, and Fig. 7B). It is inherent that the size of the jitter buffer would be increased when the variance exceeds a growth threshold in order to accommodate for delayed incoming packets. It is also inherent that the size of the jitter buffer would be decreased when the variance falls below a shrink threshold in order to reduce the transmission delay of packets.

5. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohlsson et al. in view of Cohen, and further in view of Shlomot (US 6,377,931).

Ohlsson discloses a receiving node and a method in a packet communication system that minimizes delays in packet delivery for digital voice communication by using Internet as the backbone for transmission of data (**a system for receiving digital voice signals transmitted over a data network**,

see col. 2, lines 21-26 and element 1, Fig. 2A), as described in claim 1 above, comprising a jitter buffer, a jitter buffer manager. Cohen further discloses a processor (a speed control module) at a receiving node for receiving and playing real-time audio signals over a multi-node communication network (see element 28, Fig. 1), which adjusts the size of a jitter buffer by changing the speed of playing the at least some of the audio data in the buffer (**modifying rate of consumption of packets from said jitter buffer to compensate for changes in said jitter buffer storage size**, see col. 3, lines 28-31 and lines 65-67). Ohlsson and Cohen do not explicitly show an audio decoder is arranged to receive packets from the speed control module. However, Shlomot discloses a speech communications system wherein a speed controller is used to dynamically adjust the size of a jitter buffer and to instruct a decoder to decode audio packets from the jitter buffer (see col. 2, lines 39-63). Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the systems of Ohlsson and Cohen with that of Shlomot such that a decoder is coupled to the speed controller of Cohen to decode audio data packets being played out of the jitter buffer such as the speed controller and decoder taught by Shlomot. Having a decoding means coupled to the processor (speed control module) of Cohen would modify the processor of Cohen. The motivation to do so is to decode digitized audio packets into analog audio signals because a decoding means is required to convert digital signals back into analog audio outputs recognizable by human beings.

Allowable Subject Matter

6. **Claim 17** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: comparing an average packet delay with a reference delay which corresponds to a temporally centered position in said buffer; and adjusting said variable rate of transfer of packets from said buffer when said average packet delay deviates from said centered position by more than a threshold amount, thereby moving said centered position to align with said average packet delay.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure with respect to adaptive jitter buffer.

US 6,301,258 to Ketseff et al.

US 6,360,271 to Schuster et al.

US 6,366,959 to Sidhu et. al.

US 6,212,206 to Ketcham

US 6,259,677 to Jain

US 6,580,694 to Baker

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Mew whose telephone number is 703-305-5300. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on 703-305-4798. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

KDM
ART unit 2664

RICKY NGO
PRIMARY EXAMINER